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Federal Communications Commission
Office of the Secretary

In the Matter of)
)
Request by L-3 Communications)
Security and Detection Systems, Inc.)
For Waiver of Sections 15.31, 15.35, and) File No. _____
15.205 of the Commission's Rules)

To: Chief, Office of Engineering and Technology

REQUEST FOR WAIVER

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Laura Stefani
Fletcher, Heald & Hildreth, PLC
1300 N. 17th Street, Suite 1100
Arlington, VA 22209
(703) 812-0400
*Counsel for L-3 Communications
Security and Detection Systems, Inc.*

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SUMMARY

L-3 appreciates the Commission's work in 2006 when it granted a waiver to allow its first generation of security screening devices, which are used around the U.S. in airports and other locations with unique security needs, to be certified. These ProVision® Advanced Imaging Technology systems were put in place after 9-11 to improve security screening because the technology is superior to other methods, as it has the ability to detect explosives and weapons made of plastic and ceramic.

The United States continues to face security threats. As President Obama stated in his 2016 State of the Union speech: "Priority number one is protecting the American people and going after terrorist networks. Both Al Qaida and now ISIL pose a direct threat to our people, because in today's world, even a handful of terrorists who place no value on human life, including their own, can do a lot of damage."

L-3's technology must meet America's growing security needs by improving the core threat detection technology of systems deployed in the front line of defense in aviation security. The key to this – the only technical solution available – is to design the system to operate on a wider bandwidth. In synthetic aperture-based security systems like the ProVision®, depth resolution is directly proportional to bandwidth, and improved depth resolution is necessary for detection of progressively more challenging threat scenarios.

For this reason, L-3 seeks waiver of the Commission's rules to operate the Next Gen ProVision® across the entire 20-40 GHz frequency range. It also seeks waiver of Sections 15.31(c) and 15.35(b), much as the Commission granted in the 2006 waiver.

L-3 will agree to the same conditions as the 2006 waiver.

The Next Gen ProVision® poses a negligible risk of harmful interference to other authorized users. Grant of the waiver will serve the public interest by improving aviation checkpoint and other important security screenings without undermining the intent of the rules.

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Security and Detection Systems, Inc.)
For Waiver of Sections 15.31, 15.35, and) File No. _____
15.205 of the Commission's Rules)

L-3 Communications Security and Detection Systems, Inc. (“L-3”), pursuant to Section 1.3 of the Federal Communications Commission’s (“FCC” or “Commission”) rules,¹ hereby requests a waiver of Sections 15.31(c), 15.35(b) and 15.205(a)² in order to obtain equipment certification for a mmWave synthetic aperture based Advanced Imaging Technology (“AIT”) system. Grant of this request is very much in the public interest, as it will allow the marketing of a device that will modernize airport and other security screenings, to the benefit of our national security.

¹ 47 C.F.R. § 1.3.

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BACKGROUND

L-3 Security and Detection Systems Division (“L-3”) is a wholly-owned subsidiary of L-3 Communications Corporation, which is a leading supplier of command, control, intelligence, surveillance and reconnaissance systems, aircraft modernization, and secure communication

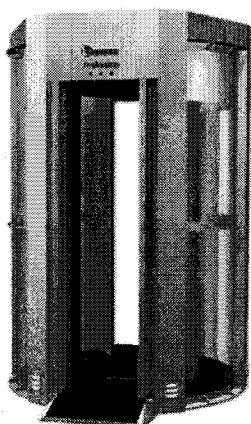


Figure 1
ProVision Unit under
2006 FCC Waiver

systems and detection products. L-3 designs a range of x-ray, explosive detection, and other security screening systems that are used worldwide by the aviation and transportation industries, ports authorities, and border control agencies.

A. History

In 2006, L-3 acquired SafeView, Inc. Prior to that acquisition and also in 2006, the FCC granted SafeView a waiver of Sections 15.31(c) and 15.35(b) of the Commission’s rules to allow for equipment certification of the SafeScout line of screening technology products.³ The SafeView device, now called ProVision®, scans a subject with a repetitive fast sweep from 24.25-30 GHz and reconstructs a 3-D holographic data set from the reflections. The waiver permits the measurement of average radiated emissions with the frequency sweep being active, rather than stopped; allows a maximum radiated peak power not to exceed 41 dB above the maximum average emissions limit; and sets measurement procedures for these emissions. The FCC determined that grant of the waiver was in the public interest, finding that it would “help improve security procedures at entry checkpoints by ensuring that any concealed dangerous

³ *SafeView, Inc., Request for Waiver of Sections 15.31 and 15.35 of the Commission’s Rules to Permit the Deployment of Security Screening Portal Devices that Operate in the 24.25-30 GHz Range*, Order, 21 FCC Rcd. 8814, ET Docket No. 04-373 (2006) (“2006 Waiver”). The technology – active radio-frequency holography – was originally developed at the Pacific Northwest National Lab by the U.S. Government for security screening, and the Federal Aviation Administration (now TSA) and Department of Energy were early funders of this work.

objects are identified, thereby enhancing national security objectives.”⁴ It also found that “the SafeView device when operated in fixed indoor locations would pose very little, if any, potential for harmful interference to licensed operations that are located either indoors or outdoors.”⁵

The waiver imposed certain conditions, including: that the devices be restricted to indoor use; that L-3 maintain a list of locations where the devices are installed (to be made available to FCC and NTIA upon request); and that L-3 inform purchasers that resale is not allowed for use within the United States unless the conditions of the waiver are met.⁶

The Commission subsequently reaffirmed the waiver, denying a request for reconsideration, while clarifying that L-3 must maintain up-to-date records of all installed devices, even following changes in the location of the device and/or transfer of ownership to third parties.⁷

B. The Next Gen ProVision®.

ProVision® is a well-recognized and accepted technology in airport passenger screening. The technology, capable of detecting both metallic and non-metallic threat objects, has become the standard in aviation checkpoint passenger screening, largely replacing conventional metal

⁴ 2006 Waiver at ¶ 8.

⁵ 2006 Waiver at ¶ 24.

⁶ 2006 Waiver at ¶ 29. Numerical limits on sales were also imposed but later lifted. *See SafeView, Inc., Request for Waiver of Sections 15.31 and 15.35 of the Commission’s Rules to Permit the Deployment of Security Screening Portal Devices that Operate in the 24.25-30 GHz Range*, Order, 24 FCC Rcd. 11550, ET Docket No. 04-373 (2009) (granting a two-year extension of the numerical sales limits); *Letter from Julius Knapp, Chief, Office of Engineering and Technology, to Mitchell Lazarus, Fletcher, Heald & Hildreth, P.L.C., Subject: Request for Permanent Renewal of, and Changes to Conditions on, Waiver Granted to SafeView, Inc.*, ET Docket No. 04-373 (July 21, 2011) (granting a permanent renewal of the waiver and removing the numerical and time limitations on the number of devices that could be sold).

⁷ *SafeView, Inc., Request for Waiver of Sections 15.31 and 15.35 of the Commission’s Rules to Permit the Deployment of Security Screening Portal Devices that Operate in the 24.25-30 GHz Range*, Memorandum Opinion and Order, 25 FCC Rcd. 592, 600, ET Docket No. 04-373 (2011) (“Reconsideration Order”).

detectors. Benefits include the ability to detect weapons made of plastic and ceramic and explosive materials, most of which have no metallic content. As with the currently deployed ProVision® AIT systems, the Next Gen ProVision® will transmit at power density levels that are orders of magnitude below the FCC OET Bulletin 65 standards for maximum permissible RF exposure to humans.

The 20-40 GHz frequency range is ideal for security screening of humans because the operating wavelength of the transmitted signals can easily pass through clothing while reflecting from the skin, providing the resolution necessary to enable robust threat detection algorithms without concern for harmful RF energy. Reliability is paramount, not just to protect the public safety, but also to perform these screenings without causing undue passenger delay, which can occur if hand searches are required to clear uncertain results. Higher frequencies above the 20 to 40 GHz range produce a stronger clothing signature that distorts the reconstructed data, which compromises the effectiveness of the detection algorithms. Operating at frequencies lower than 20 GHz, where there are correspondingly longer wavelengths, will reduce the spatial resolution, which compromises the ability to detect some threat objects.

The Transportation Security Administration ("TSA") relies on the current ProVision® system to protect aviation safety, with close to 800 operational units at airports nationwide. The technology is the only system currently qualified by TSA to meet its aviation checkpoint requirements. During peak operating levels, one unit can scan more than 300 passengers per hour. Though thousands of scans are performed each day at most checkpoints, L-3 is unaware of any reports of harmful interference from use of the ProVision® devices.

The Next Gen ProVision® technology, like the current system, relies on two vertical antenna masts containing a multitude of antenna elements arranged vertically. The masts are

enclosed within an upright cylinder measuring approximately seven feet high by four feet in diameter. Only one antenna element on each mast transmits at a time, quickly sweeping the frequency range 20-40 GHz in 13.7 microseconds per sweep, with a pause of 0.5 microseconds between sweeps and a longer pause at the end of each vertical scan line as the antenna mast physically moves through the circumferential sampling positions. Once a passenger or subject steps into the cylinder, the masts rotate around her, triggering a sequence of mmWave samples transmitted with a frequency sweep at a rate of 1.46 MHz/nanosecond. A full scan sequence takes 1.3 seconds. Because only one transmit antenna is active at any given time on the vertical array of antennas, beam forming by constructive interference will not occur. RF parameters that effect FCC compliance (*e.g.* power, transmit frequencies, and system timing) are factory set and cannot be modified by operators. An attached technical statement details the operating characteristics and provides an interference analysis.

The device measures reflections of the radio signals from the subject by taking the large number of spatial sampling points and reconstructing a 3-D holographic dataset. On TSA units, sophisticated Automatic Target Recognition (“ATR”) algorithms are applied to the 3-D dataset to detect objects concealed on the body. The detection results are presented on a generic human figure for the security officer operating the system. ATR capability is a TSA requirement for all systems deployed in US airports, and the L-3 ProVision® technology is currently the only technology qualified to meet the TSA ATR performance standards. TSA systems do not have the capability to display images of the actual passenger, nor is any personally identifiable information stored from the detection results.

C. Need for Wider Operating Bandwidth for Optimized Security Detection.

National security requires that security screening technologies keep pace with potential threats. Recent terrorist activity highlights this need. As threats become more sophisticated, so must the tools used to fight them. The Obama Administration's Office of Science and Technology Policy explains that: "New developments in science and technology (S&T) play a key role in predicting and addressing threats to our national and economic security."⁸

It is time to upgrade the present L-3 system, designed more than a decade ago, so that it may continue to meet emerging threats to security. Better performance will ensure better protection. The TSA has defined a roadmap for AIT technology,⁹ making security effectiveness one the key requirements. The roadmap states that methods of improving security effectiveness include reducing false positive alarm rates, advancing detection algorithms, and expanding the threat targets. The Next Gen ProVision® technology will meet all of these requirements, but requires operating on the requested 20-40 GHz bandwidth to do so.

For synthetic aperture-based security screening systems such as ProVision®, scanning region depth resolution is directly proportional to bandwidth. Greater bandwidth will allow for detection of progressively more challenging threat scenarios. In practical terms, greater depth resolution will allow the technology to better distinguish between concealed threats and normal characteristics of the person's body and clothing. This enhanced discrimination capability will significantly improve threat detection and reduce the number of false positives that result in hand searches to resolve the alarm. The present system uses approximately 5.75 GHz of bandwidth. In contrast, the Next Gen ProVision® will use 20 GHz of bandwidth, which will improve the depth

⁸ Office of Science and Technology Policy, Division of National Security and International Affairs, <https://www.whitehouse.gov/administration/eop/ostp/divisions/natsecintaff>.

⁹ *Advanced Imaging Technology Roadmap*, Solicitation Number: TSA OSC AIT Roadmap, (Feb. 13, 2015), available at <https://www.fbo.gov/> (last accessed January 19, 2016).

resolution by more than a factor of three. This improved depth resolution is a key enabler for advanced algorithms to detect more challenging threats with fewer false positive alarms.

DISCUSSION

Keeping pace with the challenges of threat detection and false positive alarm performance requirements compels improvements in the L-3 system. Because threat detection performance is highly dependent on bandwidth, L-3 seeks to operate the Next Gen ProVision® across 20-40 GHz, which unavoidably includes certain Part 15 restricted bands.¹⁰ Grant of the waiver will serve the public interest by improving security screening without undermining the intent of the rules. The Next Gen ProVision® system will not cause harmful interference to licensed services.

A. Request for Waiver.

1. *Waiver of Sections 15.31(c) and 15.35(b).*

L-3 requests that the Commission waive Sections 15.31(c) and 15.35(b), much as it did in the 2006 waiver. Section 15.209 sets out the radiated emissions limits for unlicensed intentional radiators.¹¹ Section 15.31 establishes methods for measuring emissions, and in particular Section 15.31(c) specifies that measurements for swept frequency equipment “shall be made with the frequency sweep stopped at those frequencies chosen for the measurements to be reported.”¹² Section 15.35(b) limits peak RF emissions to 20 dB above the maximum permitted

¹⁰ L-3 recognizes that the Commission recently issued a Notice of Proposed Rulemaking involving the 28, 37 and 39 GHz bands. *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Notice of Proposed Rulemaking, GH Docket No. 14-77 et al., (rel. Oct. 23, 2015). Regardless of the outcomes of the proposals, standards for 5G mobile use of the frequencies likely will not be set for five years. L-3 acknowledges that its obligations under Section 15.5 to avoid causing interference to licensed operations will apply to any licensed 5G services.

¹¹ 47 C.F.R. § 15.209(a).

¹² 15 C.F.R. § 15.31(c).

average.¹³ The purpose of all these rules is to ensure that unlicensed intentional radiators operate without causing harmful interference to licensed operations.¹⁴

The Next Gen ProVision® meets the average power requirements of Section 15.209 when measured with the sweep running but not when it is stopped. Measurements with the sweep stopped, which concentrate all the energy at a single frequency, improperly equate average power to the peak power and greatly overstate the interference potential of the fast sweeping L-3 signal. For this reason, L-3 requires waiver of Section 15.31(c) to permit measurement of average radiated emissions with the frequency sweep active, as specified in the measurement procedures established in the 2006 Waiver Order.¹⁵

Section 15.35(b) limits the peak emissions from unlicensed devices to 20 dB above the corresponding maximum average emission limit set out in Section 15.209.¹⁶ L-3 seeks a waiver to allow peak radiated power at no more than 41 dB above the Section 15.209 maximum permitted average limit of 500 microvolts/meter at 3 meters (equivalent to -41.3 dBm EIRP). The requested peak limit is -0.3 dBm EIRP. The Commission previously provided that peak radiated power should not to exceed “a level that is 41 dB above the average emissions limit when measured with the transmitter frequency sweep stopped and in accordance with the procedures specified herein.”¹⁷ L-3 specifically requests that the language in the new waiver provide that “the allowable radiated peak power shall not exceed 41 dB above the maximum permitted average emission limit of 500 microvolt/meter at 3 meters.” Relating the peak power

¹³ 47 C.F.R. § 15.35(b).

¹⁴ See 2006 Waiver at ¶ 3.

¹⁵ 2006 Waiver at ¶ 8(a).

¹⁶ 47 C.F.R. § 15.35(b) (“Unless otherwise specified . . . the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.”).

¹⁷ 2006 Waiver at ¶ 1; *see also* 2006 Waiver at ¶ 25.

level to the maximum allowed average, rather than the system average, would better align the waiver language to the rules and avoids the consequence of further limiting the allowable peak power that would result from referencing to the measured average of the faster sweeping frequency ramp in the new system.¹⁸

L-3 cannot reduce power without impairing its mission. In order to generate reconstructed data of sufficient quality to support future threat detection requirements, the system must be permitted to transmit with a peak level of -0.3 dBm EIRP. Reducing peak power to levels low enough to comply with the rules would render the device unable to meet the resolution requirements for threat detection.

The waiver will nonetheless achieve the purpose of Sections 15.31 and 15.35: avoiding transient interference. The device's fast sweep distributes a very low level of energy across a wide range of spectrum, rendering it harmless to any receiver. As a condition of the waiver, the devices will be used only indoors, where high building attenuation will protect victim receivers. The duty cycle is extremely low. A given victim receiver with a 10 MHz passband would see emissions from the Next Gen ProVision® 6.8 nanoseconds at a time, with a duty cycle of -33 dB during the active frequency sweep. The duty cycle is further reduced by the scanning and operational characteristics of the system.

2. Waiver of Section 15.205 (Restricted Bands).

The FCC rules bar unlicensed devices from operating on certain frequency bands.¹⁹ To engage in wideband operations so as to improve threat detection, L-3 must operate across five of

¹⁸ The faster frequency sweep of the Next Gen system, which makes it a better spectrum neighbor, will result in a lower measured average power. This would result in a lower allowable peak power unless it is related to the maximum allowed average.

¹⁹ 47 C.F.R. § 15.205(a).

these “restricted” bands: 22.01-23.12 GHz, 23.6-24 GHz, 31.2-31.8 GHz, 36.43-36.5 GHz, and 38.6-40 GHz.

The first four of these bands were restricted to protect radio astronomy and the Earth Exploration Satellite Service (“EESS”). The fifth, 38.6-40 GHz, marks the beginning of a blanket restriction against operations on any frequencies above 38.6 GHz, a policy instituted at a time when there were no service rules in this frequency range. Today, 38.6-40 GHz is allocated as a satellite downlink band that is limited to gateway earth station operations and subject to unusually stringent frequency coordination requirements.²⁰

Sharing between radio astronomy and other services depends upon the predictability of interference and the use of distance separation. When potential interfering sources are fixed and predictable, distance separation can provide effective protection. Here, the limited number of radio astronomy sites observing at these frequencies, the commercial (non-consumer) nature of the L-3 device, and L-3’s commitment to maintain a list of locations where the devices are installed all combine to make distance separation a reliable means of preventing harmful interference. Knowledge of the location of the devices and the responsibility as an unlicensed operator to cease operations in the event of interference to licensed services will ensure protection of radio astronomy, and of other incumbents.²¹

Based on information from the passive user community, L-3 understands that a 50 km separation distance will provide sufficient protection to radio astronomy. L-3 will agree as a condition of the waiver to coordinate installations for any location closer than 50 km to a facility

²⁰ Earth station licensees must obtain a Fixed Service license or the consent of those licensees, and facilities may not be ubiquitously deployed and may not serve individual customers. 47 C.F.R. § 25.202(a)(1) note 3.

²¹ Should harmful interference be detected, the L-3 devices could be moved so that the emissions are focused in another direction, or protective shielding could be placed in strategic locations in the area where the device is located.

that observes in the 20-40 GHz frequency range, and additionally to coordinate any installation which is in line of sight to the observatory at Kitt Peak.

EESS also will be fully protected. The attached Technical Statement details a link budget that demonstrates a comfortable margin below the ITU-recommended interference criteria.²²

There is precedent for the Commission allowing Part 15 devices to operate in the restricted bands. The Rules have long exempted unlicensed PCS and ultra-wideband devices from the prohibition.²³ The Commission has granted waivers permitting tank level probing radars on bands above 38.6 GHz.²⁴ And, the Commission modified its rules to allow unlicensed level probing radars in the 77-81 GHz restricted band upon a finding that the limited numbers of incumbents and high free space propagation losses would render unlikely harmful interference beyond a short distance.²⁵

In other similar cases, the Commission determined that, where a Part 15 device operates at low power levels and low duty cycle, and under other circumstances that

²² L-3 understands that, given the protective elements of the waiver request (to include indoor operation, low power, retention of location data, and the Part 15 requirement to cure interference), members of the EESS community do not anticipate harmful interference from the L-3 system.

²³ 47 C.F.R. § 15.205(d)(6).

²⁴ *Amendment of Part 15 of the Commission's Rules To Establish Regulations for Tank Level Probing Radars in the Frequency Band 77-81 GHz, Notice of Proposed Rulemaking and Order, ET Docket Nos. 10-23, 06-216 and 07-96*, 25 FCC Rcd 601 (2010). Similar to the 20-40 GHz frequency range being considered here, incumbents in the 77-81 GHz band include radio astronomy, fixed/mobile/fixed satellite, mobile satellite, broadcast and broadcast satellite, radiolocation, space research (space-to-Earth), amateur and amateur satellite services.

²⁵ *Amendment of Part 15 of the Commission's Rules To Establish Regulations for Tank Level Probing Radars in the Frequency Band 77-81 GHz; Amendment of Part 15 of the Commission's Rules To Establish Regulations for Level Probing Radars and Tank Level Probing Radars in the Frequency Bands 5.925-7.250 GHz, 24.05-29.00 GHz and 75-85 GHz; Ohmart/VEGA Corp., Request for Waiver of Section 15.252 to Permit Marketing of Level Probing Radars in the 26 GHz Band, Report and Order*, 29 FCC Rcd 761 (2014). The Commission did require the radar devices to operate only in fixed locations, a condition that L-3 also proposes to accept here.

ensured protection of incumbents, waiver of Section 15.205 is appropriate.²⁶ The same considerations apply here.

Some of the Section 15.205 restricted bands also appear in U.S. Footnote 246, which provides that “[n]o station shall be authorize to transmit in the following bands”²⁷ Footnote 246 does not apply to the L-3 device. The footnote is part of the Table of Allocations, while Part 15 operates outside the Table.²⁸ Rather, the footnote is directed towards the Commission’s licensing function (“no station shall be authorized”) for allocated services, not unlicensed use. Similarly, Section 15.5 requires unlicensed devices to accept interference from, and avoid causing interference to, “an authorized radio station,” while leaving unlicensed devices unprotected.²⁹ It makes sense to read the prohibition in Footnote 246 as distinguishing “authorized” devices from unlicensed devices, especially since certain unlicensed devices are permitted by the rules to operate in these bands.³⁰

²⁶ See *Boston Scientific Corp., Request for Waiver of Section 15.205 of the Commission’s Rules to Permit the Marketing and Operation of Certain Medical Communications Devices that Operate in the 90-110 kHz Band*, Order, 26 FCC Rcd 11405 (2011) (waiver of Part 15 rule to allow marketing and unlicensed operation of implanted cardiac devices in restricted bands); *Bluechip Ltd. Tracking Solutions, Request for Waiver of Section 15.205(a) of the Commission’s Rules*, Order, 26 FCC Rcd 3714 (2011) (finding the potential to cause interference to “authorized services in the restricted bands is extremely low”); *Respironics, Inc. and Boston Scientific Corporation; Requests for Waiver of Section 15.205 of the Commission’s Rules to Permit the Marketing and Operation of Certain Medical Communications Devices that Operate in the 90-110 kHz Band*, Order, 21 FCC Rcd. 13450 (2006) (noting that the operations “pose a negligible risk of causing the interference our rules are designed to protect”).

²⁷ 47 C.F.R. § 2.106 n.US246 (including the 23.6-24 GHz and 31.3-31.8 GHz bands in the list).

²⁸ See *Curtiss-Wright Controls, Inc.*, Order, 27 FCC Rcd. 234 at ¶ 16 n.32 (“ . . . Footnote US246 of the Table of Frequency Allocations . . . prohibits emissions from authorized stations in frequency bands allocated for passive services. Because we are authorizing [this] unlicensed device under Part 15 of our Rules rather than an allocated service, *the Table of Frequency Allocations is not applicable.*”) (emphasis added). While the subject device was required to notch out restricted frequencies, it was for reasons not relevant here.

²⁹ 47 C.F.R. § 15.5(b) (emphasis added).

³⁰ The U.S. Court of Appeals has endorsed the Commission’s long-standing distinction between a licensed transmitter and an unlicensed device (*i.e.* those that do not “transmit [] enough energy

The language of Footnote 246 does not bar the requested waiver. And the attached technical statement provides a rigorous, quantitative showing that L-3 will not cause interference to the services that Footnote 246 is intended to protect.

B. Public Interest.

The very serious and important public interest needs here justify the requested waiver. The Commission has previously determined that the current L-3 device serves the public interest, noting that it will be “providing transportation, law enforcement and security entities with a reliable and innovative means of protecting the American public.”³¹ Our nation’s security interests are no less today than when the 2006 waiver was granted.³²

When Congress constituted the Commission in 1934, it did so in part “for the purpose of promoting safety of life and property through the use of wire and radio communications.”³³ The L-3 system directly serves this purpose. A device designed to help ensure the safety of the U.S. aviation system is presumptively in the public interest.

There is negligible risk of interference to other users. Factors that will minimize potential interference are low transmit levels, low duty cycle, high free space loss, low dwell time in any receiver passband, the directionality of the L-3 system antenna, high building attenuation factors in this frequency range, and the directionality of victim receivers. Based on these same factors, the Commission found that the current L-3 device, when operated in fixed indoor locations,

to have a significant potential for causing harmful interference’ to licensed radio operators”). *American Radio Relay League, Inc. v. FCC*, 524 F.3d 227, 234 (D.C. Cir. 2008).

³¹ 2006 Waiver at ¶¶ 8, 25.

³² See The White House Fact Sheet, “The 2015 National Security Strategy” (Feb. 2015), available at <https://www.whitehouse.gov/the-press-office/2015/02/06/fact-sheet-2015-national-security-strategy>, (“[W]e continue to face serious challenges to our national security, even as we are working to shape the opportunities of tomorrow. Violent extremism and an evolving terrorist threat raise a persistent risk of attacks on America and our allies.”).

³³ 47 U.S.C. § 151.

“would pose very little, if any, potential for harmful interference to licensed operations that are located either outdoors or indoors.”³⁴ The same reasoning applies here, as the proposed operations will preclude any realistic threat of interference to incumbents in the 20-40 GHz range, including those in the restricted bands.

In fact, the Next Gen ProVision® will provide better protection than the current model, as it will have a faster frequency sweep (“chirp”) through narrowband receive channels, with approximately the same scan time and transmitted power level. The transmit signals will have a lower effective duty cycle, as seen by a narrowband victim receiver. The reduced time that the signal is present in any passband will lower the potential for interference.

As noted, L-3 has attached a technical statement demonstrating that harmful interference to incumbents will be unlikely. Even in the worst case scenario for incumbent fixed licensees – when the L-3 system is positioned directly in the receiver antenna boresight – there are wide margins of safety against harmful interference.³⁵ The technical statement also shows more than adequate margins of protection to EESS, based on stringent ITU criteria.³⁶ Amateur and satellite operations will be similarly protected.³⁷

The following factors detail a very limited potential for harmful interference to any other user:

³⁴ Reconsideration Order at 598, ¶ 15; 2006 Waiver at ¶ 24.

³⁵ Technical Statement at Section 2: Interference Analysis for Point-to-Point Radio Receivers.

³⁶ Because of the proposal to coordinate with any RAS observatory operating on the bands within 50 km of an L-3 installation site, an interference analysis for radio astronomy is unnecessary.

³⁷ ARRL notes with regard to 24 GHz that “[a]mateur spectrum usage, though different, is generally compatible with military and governmental use.” *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Comments of ARRL, GN Docket No. 14-177 et al. (filed Jan. 15, 2015). And satellite downlinks to non-mobile earth stations are often to facilities located in office parks and similar locals, distanced from any L-3 installations.

Low Power: The device operates at an average power of -41.3 dBm/MHz (the same as FCC Class B devices), for no more than 100 milliseconds as measured with the sweep active, and at a peak power of -0.3 dBm (41 dB above the average power limit).

Indoor Operation: L-3 will commit to a waiver condition that limits operations to indoor locations. In most cases, a victim receiver located outside of the building will be protected by attenuation from the building walls. At locations constructed with concrete block, for example, the walls will attenuate signals by at least 35 dB at 20 GHz, and more at higher frequencies.³⁸ Other industrial and commercial building materials will provide similar attenuation.

Short Dwell Time: The system has a high sweep speed so that transmissions into victim receiver passband will be present for only 0.7 nanoseconds per MHz of receiver bandwidth. This means that the signal will be undetected by all but extremely wideband receivers, and even then only when the L-3 system is in very close proximity and on antenna boresight of the victim receiver.

Sparse Deployment: Currently, the geographic density of ProVision® deployment – approximately 200 locations around the U.S – is very low. Given the specific nature of the commercial use, as well as the high cost, deployment will remain limited.

Low Duty Cycle: Given the 20 GHz operating bandwidth, the L-3 signal will be present in a receiver passband for only 0.005% of the time per MHz of passband. For example, a 10 MHz victim receiver will see a worst case duty cycle of -33 dB during the active scan with this being further reduced by the intermittent scanning utilization inherent in the operational use of the system.

³⁸ See Technical Statement at Figure 6: One Way Path Loss of Building Materials versus Frequency.

Revolving Antenna: The device antennas are directional and in rotary motion when transmitting, so any victim receiver will be in the beamwidth for only a fraction of the rotation. This further reduces the energy reaching the receiver. During most use, a subject standing within the device (in the L-3 system antenna boresight) would further diffuse transmitted energy.

Unlicensed Status: As an unlicensed device, the L-3 device will remain subject to Section 15.5, which requires that all unlicensed devices not cause harmful interference to authorized users.³⁹ In the extremely unlikely event that an incumbent would receive harmful interference, L-3 would have to cease operations unless or until it could remedy the interference.⁴⁰ As noted above, L-3 will agree as a condition of this waiver to maintain a list of locations where the device is installed (and impose the same requirement on buyers) so that L-3 can promptly identify any offending device and take corrective action.

C. Legal Basis.

The Commission previously found that waiver of Sections 15.31(c) and 15.35(b), with certain operational and technical restrictions as a condition of the waiver, would protect authorized users from harmful interference and would not undermine the purpose of these rules.⁴¹ The same reasons also support this waiver request.

The Commission assesses waiver requests according to the standards set out in *WAIT Radio v. FCC*.⁴² In that case, as here, the applicant sought authority in contravention of the rules while explaining

³⁹ 47 C.F.R. § 15.5.

⁴⁰ By maintaining a list of installations, suspected cases of interference could easily be tracked down and addressed.

⁴¹ 2006 Waiver Request at ¶ 8.

⁴² 418 F.2d 1153 (D.C. Cir. 1969). See also, *2002 Biennial Regulatory Review*, 18 FCC Rcd 13620 at para. 85 n.130 (2003) (citing *WAIT Radio* as “setting out criteria for waivers of Commission rules.”)

how it would nonetheless accomplish the purpose of the rules.⁴³ The court required the Commission to consider the request:

[A] general rule, deemed valid because its overall objectives are in the public interest, may not be in the “public interest” if extended to an applicant who proposes a new service that will not undermine the policy, served by the rule, that has been adjudged in the public interest.⁴⁴

Waiver is appropriate where the applicant furthers the public interest inherent in the underlying rules.

The waiver requested here meets the *WAIT Radio* standard: it proposes a device that will advance the policy served by the rules. The Part 15 rules are designed to ensure that “there is a low probability that these unlicensed devices will cause harmful interference to authorized users.”⁴⁵ The L-3 system will enhance security in airports and other locations, with no added risk of harmful interference to authorized users. The requested waiver fits easily into the boundaries drawn by *WAIT Radio*.

The Court of Appeals emphasized the importance of waiver procedures as part of the regulatory scheme:

The agency’s discretion to proceed in difficult areas through general rules is intimately linked to the existence of a safety valve procedure for consideration of an application for exemption based on special circumstances.⁴⁶

Thus, requests “such as those made by petitioners, stated with clarity and accompanied by supporting data ... must be given a ‘hard look.’”⁴⁷ Here, too, the waiver request fully qualifies.

⁴³ *WAIT Radio* operated an AM broadcast station. It was limited to daylight hours so as to afford protection to “white areas” that had no local service, and that relied on nighttime skywave propagation from another station. *WAIT Radio* proposed to transmit at night using a directional antenna that would limit its signal in the white areas. *WAIT Radio v. FCC*, 418 F.2d at 1154-55.

⁴⁴ *WAIT Radio v. FCC*, 418 F.2d at 1157.

⁴⁵ *Multispectral Solutions, Inc. Request for Waiver of Section 15.250 of the Commission’s Rules*, Order, 22 FCC Rcd 9831 (2007) (“*Multispectral Solutions*”); see also *American Radio Relay League, Inc. v. FCC*, 524 F.3d at 234.

⁴⁶ *WAIT Radio v. FCC*, 418 F.2d at 1157.

⁴⁷ *Id.* (citation footnote omitted).

The "safety valve" of the waiver procedure is needed to make available a device that is the only one commercially available to meet TSA's passenger screening requirements and meet our country's national security needs.

The requested waiver clearly is in the public interest, not only in terms of benefits to the public but also in the absence of any downside. The request is entitled not only to the "hard look" mandated in *WAIT Radio*, but to a grant of the waiver.

CONCLUSION

For the foregoing reasons, L-3 respectfully requests that the Office of Engineering and Technology ("OET") grant waiver of the rules to permit equipment certification of its Next Gen ProVision® device. Doing so will support national security efforts and improve the airport checkpoint screening experience for U.S. citizens while protecting other users from harmful interference.

Respectfully submitted,

**L-3 COMMUNICATIONS SECURITY AND
DETECTION SYSTEMS, INC.**



Laura Stefani
Fletcher, Heald & Hildreth, PLC
1300 N. 17th Street, Suite 1100
Arlington, VA 22209
(703) 812-0400
Its Attorneys

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